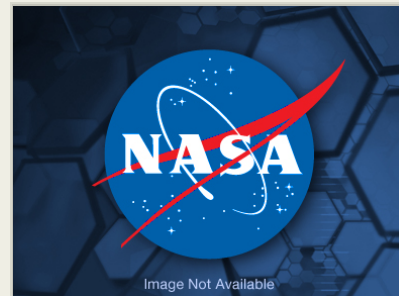
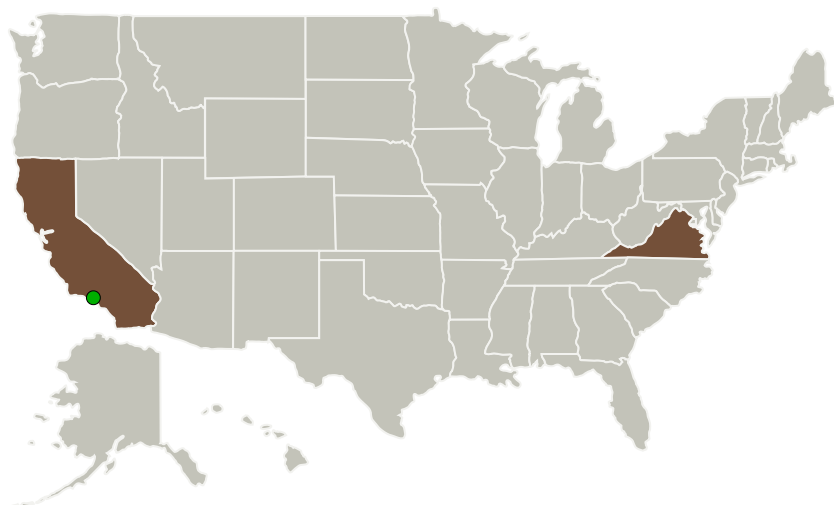




## Project Introduction

The theme of this proposal is the laboratory spectroscopy of molecules of importance in cool astronomical objects, including low mass stars, extrasolar planets, brown dwarfs, M-type stars and comets. Our primary focus will be on hot methane and ammonia, and metal hydrides (e.g., MgH, CaH, CrH and FeH). These molecules are key species for the classification of the spectra of cool stellar and sub-stellar objects. We plan to provide line positions, line intensities and lower state energies by combining experimental and theoretical data in an optimal way to create spectral line lists. These line lists are easily converted to molecular opacities that are used to compute spectral energy distributions emitted by cool objects. The experimental part of the research will be carried out by recording Fourier transform spectra using a variety of molecular sources. Cool objects such as brown dwarfs and extrasolar planets are primary targets for a number of NASA missions such as Kepler, SOFIA and JWST.

## Primary U.S. Work Locations and Key Partners



Infrared and Near Infrared Spectroscopy of Astrophysical Molecules

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## Organizational Responsibility

### Responsible Mission Directorate:

Science Mission Directorate (SMD)

### Responsible Program:

Astrophysics Research and Analysis

## Infrared and Near Infrared Spectroscopy of Astrophysical Molecules



Completed Technology Project (2014 - 2016)

Organizations Performing Work	Role	Type	Location
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
University College London	Supporting Organization	Academia	Dorking, United Kingdom

## Primary U.S. Work Locations

California	Virginia
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## Project Management

**Program Director:**

Michael A Garcia

**Program Manager:**

Dominic J Benford

**Principal Investigator:**

Peter F Bernath

**Co-Investigators:**

Mark R Swain

Jonathan Tennyson

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
  - └ TX08.1.6 Cryogenic / Thermal

## Target Destination

Outside the Solar System